

### Subpart 56.30—Selection and Limitations of Piping Joints

#### § 56.30–1 Scope (replaces 110 through 118).

The selection and limitation of piping joints must be as required by this subpart rather than as required by 110 through 118 of ASME B31.1 (incorporated by reference; see 46 CFR 56.01–2); however, certain requirements are marked “reproduced” in this subpart.

[USCG–2003–16630, 73 FR 65177, Oct. 31, 2008]

#### § 56.30–3 Piping joints (reproduces 110).

The type of piping joint used shall be suitable for the design conditions and shall be selected with consideration of joint tightness, mechanical strength and the nature of the fluid handled.

#### § 56.30–5 Welded joints.

(a) *General.* Welded joints may be used for materials for which welding procedures, welders, and welding machine operators have been qualified in accordance with part 57 of this subchapter.

(b) *Butt welds—general.* Butt welds may be made with or without backing or insert rings within the limitations established in § 56.70–15. When the use of backing rings will result in undesirable conditions such as severe stress concentrations, corrosion or erosion, then:

(1) The backing rings shall be removed and the inside of the joint ground smooth, or

(2) The joint shall be welded without backing rings, or

(3) Consumable insert rings must be used. Commonly used types of butt welding end preparations are shown in ASME B16.25 (incorporated by reference; see 46 CFR 56.01–2).

(4) Restrictions as to the use of backing rings appear for the low temperature piping systems and should be checked when designing for these systems.

(c) *Socket welds (Modifies 127.3.3A.).*

(1) Each socket weld must conform to ASME B16.11 (incorporated by reference; see 46 CFR 56.01–2), to applicable standards listed in 46 CFR 56.60–1, Table 56.60–1(b), and to Figure 127.4.4C

in ASME B31.1 (incorporated by reference; see 46 CFR 56.01–2) as modified by § 56.30–10(b)(4) of this part. A gap of approximately one-sixteenth inch between the end of the pipe and the bottom of the socket must be provided before welding. This may best be provided by bottoming the pipe and backing off slightly before tacking.

(2) Socket welds must not be used where severe erosion or crevice corrosion is expected to occur. Restrictions on the use of socket welds appear in § 56.70–15(d)(3) of this part for Class I service and in § 56.50–105 of this part for low temperature service. These sections should be checked when designing for these systems. See § 56.70–15(d)(4) of this part for Class II service.

(3) (*Reproduces 111.3.4.*) Drains and by-passes may be attached to a fitting or valve by socket welding provided the socket depth, bore diameter and shoulder thickness conform to ASME B16.11.

(d) *Fillet welds.* A fillet weld may vary from convex to concave. The size of a fillet weld is determined as shown in Figure 127.4.4A of ASME B31.1. Fillet-weld details for socket-welding components must meet § 56.30–5(c). Fillet-weld details for flanges must meet § 56.30–10 of this part (see also § 56.70–15(d)(3) and (4) of this part for applications of fillet welds).

(e) *Seal welds.* Seal welds may be used but shall not be considered as contributing any strength to the joint.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGFR 69–127, 35 FR 9978, June 17, 1970; CGD 77–140, 54 FR 40605, Oct. 2, 1989; CGD 95–012, 60 FR 48050, Sept. 18, 1995; USCG–2003–16630, 73 FR 65177, Oct. 31, 2008]

#### § 56.30–10 Flanged joints (modifies 104.5.1(a)).

(a) Flanged or butt-welded joints are required for Classes I and I-L piping for nominal diameters exceeding 2 inches, except as otherwise specified in this subchapter.

(b) Flanges may be attached by any method shown in Figure 56.30–10(b) or by any additional means that may be approved by the Marine Safety Center. Pressure temperature ratings of the appropriate ANSI/ASME standard must not be exceeded.

(1) *Figure 56.30–10(b), Method 1.* Flanges with screw threads may be

used in accordance with 46 CFR 56.30-20, Table 56.30-20(c).

(2) *Figure 56.30-10(b), Method 2.* ASME B16.5 (incorporated by reference; see 46 CFR 56.01-2) Class 150 and Class 300 low-hubbed flanges with screw threads, plus the addition of a strength fillet weld of the size as shown, may be used in Class I systems not exceeding 750 °F or 4 NPS, in Class II systems without diameter limitations, and in Class II-L systems not exceeding 1 NPS. If 100 percent radiography is required by 46 CFR 56.95-10 for the class, diameter, wall thickness, and material of pipe being joined, the use of the threaded flanges is not permitted and butt-welding flanges must be provided. For Class II piping systems, the size of the strength fillet may be limited to a maximum of 0.525 inch instead of 1.4T.

(3) *Figure 56.30-10(b), Method 3.* Slip-on flanges meeting ASME B16.5 may be used in piping systems of Class I, Class II, or Class II-L not to exceed the service pressure-temperature ratings for flanges of class 300 and lower, within the temperature limitations of the material selected for use, and not to exceed 4-inch Nominal Pipe Size (NPS) in systems of Class I and Class II-L. If 100 percent radiography is required by 46 CFR 56.95-10 for the class, diameter, wall thickness, and material of the pipe being joined, then slip-on flanges are not permitted and butt-welding flanges are required. The configuration in Figure 127.4.4B(b) of ASME B31.1 (incorporated by reference; see 46 CFR 56.01-2), using a face and backweld, may be preferable where eliminating void spaces is desirable. For systems of Class II, the size of the strength fillet may be limited to a maximum of 0.525 inch instead of 1.4T, and the distance from the face of the flange to the end of the pipe may be a maximum of three-eighths of an inch. Restrictions on the use of slip-on flanges appear in 46 CFR 56.50-105 for low-temperature piping systems.

(4) *Figure 56.30-10(b), Method 4.* ASME B16.5 socket welding flanges may be used in Class I or II-L systems not exceeding 3 NPS for class 600 and lower class flanges and 2 1/2 NPS for class 900 and class 1500 flanges within the service pressure-temperature ratings of the standard. Whenever full radiography is

required by 46 CFR 56.95-10 for the class, diameter, and wall thickness of the pipe being joined, the use of socket welding flanges is not permitted and a butt weld type connection must be provided. For Class II piping, socket welding flanges may be used without diameter limitation, and the size of the fillet weld may be limited to a maximum of 0.525 inch instead of 1.4T. Restrictions on the use of socket welds appear in 46 CFR 56.50-105 for low temperature piping systems.

(5) *Figure 56.30-10(b), Method 5.* Flanges fabricated from steel plate meeting the requirements of part 54 of this chapter may be used for Class II piping for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 450 °F. Plate material listed in UCS-6(b) of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 56.01-2) may not be used in this application, except that material meeting ASTM A 36 (incorporated by reference, see 46 CFR 56.01-2) may be used. The fabricated flanges must conform at least to the ASME B16.5 class 150 flange dimensions. The size of the strength fillet weld may be limited to a maximum of 0.525 inches instead of 1.4T and the distance from the face of the flange to the end of the pipe may be a maximum of three-eighths inch.

(6) *Figure 56.30-10 (b), Method 6.* Steel plate flanges meeting the material and construction requirements listed in paragraph (b)(5) of this section may be used for Class II piping for pressures not exceeding 150 pounds per square inch or temperatures not exceeding 650 °F. The flange shall be attached to the pipe as shown by Figure 56.30-10(b). Method 6. The pressure shall not exceed the American National Standard Service pressure temperature rating. The size of the strength fillet weld may be limited to a maximum of 0.525 inch instead of 1.4T and the distance from the face of the flange to the end of the pipe may be a maximum of three-eighths inch.

(7) *Figure 56.30-10 (b), Method 7.* Lap joint flanges (Van Stone) may be used for Class I and Class II piping. The Van Stone equipment must be operated by competent personnel. The ends of the pipe must be heated from 1,650° to 1,900

°F. dependent on the size of the pipe prior to the flanging operation. The foregoing temperatures must be carefully adhered to in order to prevent excess scaling of the pipe. The extra thickness of metal built up in the end of the pipe during the forming operation must be machined to restore the pipe to its original diameter. The machined surface must be free from surface defects and the back of the Van Stone lap must be machined to a fine tool finish to furnish a line contact with the mating surface on the flange for the full circumference as close as possible to the fillet of the flange. The number of heats to be used in forming a flange must be determined by the size of the pipe and not more than two pushups per heat are permitted. The width of the lap flange must be at least three times the thickness of the pipe wall and the end of the pipe must be properly stress relieved after the flanging operation is completed. Manufacturers desiring to produce this type of joint must demonstrate to a marine inspector that they have the proper equipment and personnel to produce an acceptable joint.

(8) *Figure 56.30-10 (b), Method 8.* Welding neck flanges may be used on any piping provided the flanges are butt-welded to the pipe. The joint must be welded as indicated by Figure 56.30-10(b), Method 8, and a backing ring employed which will permit complete penetration of the weld metal. If a backing ring is not used, refer to 46 CFR 56.30-5(b) for requirements.

(9) *Figure 56.30-10 (b), Method 9.* Welding neck flanges may also be attached to pipe by a double-welded butt joint as shown by Figure 56.30-10(b), Method 9.

(10) *Figure 56.30-10 (b), Method 10.* Flanges may be attached by shrinking the flange on to the end of the pipe and flaring the end of the pipe to an angle of not less than 20°. A fillet weld of the size shown by Figure 56.30-10(b), Method 10, must be used to attach the hub to the pipe. This type of flange is limited to a maximum pressure of 300 pounds per square inch at temperatures not exceeding 500 °F.

(11) *Figure 56.30-10(b), Method 11.* The flange of the type described and illustrated by Figure 56.30-10(b), Method 10,

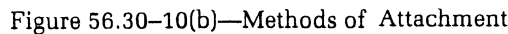
except with the fillet weld omitted, may be used for Class II piping for pressures not exceeding 150 pounds per square inch and temperatures not exceeding 450 °F.

(12) *Figure 56.30-10(b), Method 12.* High-hub bronze flanges may be used for temperatures not exceeding 425 °F. The hub of the flange must be bored to a depth not less than that required for a threaded connection of the same diameter leaving a shoulder for the pipe to butt against. A preinserted ring of silver brazing alloy having a melting point not less than 1,000 °F and of sufficient quantity to fill the annular clearance between the flange and the pipe must be inserted in the groove. The pipe must then be inserted in the flange and sufficient heat applied externally to melt the brazing alloy until it completely fills the clearance between the hub and the flange of the pipe. A suitable flux must be applied to the surfaces to be joined to produce a satisfactory joint.

(13) *Figure 56.30-10(b), Method 13.* The type of flange as described for Figure 56.30-10(b), Method 12, may be employed and in lieu of an annular groove being machined in the hub of the flange for the preinserted ring of silver brazing alloy, a bevel may be machined on the end of the hub and the silver brazing alloy introduced from the end of the hub to attach the pipe to the flange.

(14) *Figure 56.30-10(b), Method 14.* Flanges may be attached to nonferrous pipe by inserting the pipe in the flange and flanging the end of the pipe into the recess machined in the face of the flange to receive it. The width of the flange must be not less than three times the pipe wall thickness. In addition, the pipe must be securely brazed to the wall of the flange.

(15) *Figure 56.30-10(b), Method 15.* The flange of the type described and illustrated by Figure 56.30-10(b), Method 14, except with the brazing omitted, may be used for Class II piping and where the temperature does not exceed 250 °F.



(b) [Reserved]